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**Conditional Analysis of Dynamically Distinct Regions in Stratified Turbulence**[1] GAVIN PORTWOOD, STEPHEN DE BRUYN KOPS, University of Massachusetts, JOHN TAYLOR, University of Cambridge, HASEM SALEHIPOUR, University of Toronto, COLM-CILLE CAULFIELD, University of Cambridge — Stratified flows have been shown to exhibit broadly intermittent flow dynamics at large scales. In DNS of forced homogeneous stratified turbulence, we employ a conditional averaging technique to distinguish compositional flow regions which define the entire flow domain. Here, we condition on the vertical density gradient at inertial and buoyancy length scales to subdivide homogeneous stratified turbulence into three distinct regions that may be characterised by $\mathrm{Gn} \equiv \epsilon/\nu \mathrm{N}^2$. We show that flows across the Fr-Re parameter space exhibit regions of (a) moderately 'quiescent' flow with few three-dimensional overturnings, (b) 'layered' turbulent regions which have constrained vertical length scales, and (c) three dimensional 'patches' of turbulence and that these regions may be characterised by $\mathrm{Gn} \sim \mathrm{O}(1)$, $\mathrm{Gn} \sim \mathrm{O}(10)$, and $\mathrm{Gn} \sim \mathrm{O}(100)$, respectively. We conjecture that treating stratified turbulence as an instantaneous assemblage of these different regions in varying proportions may explain some of the apparently highly scattered flow dynamics and statistics previously reported in the literature.

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